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AN INFECTIOUS BRAIN DISEASE OF HORSES AND MULES

(*Encephalomyelitis*)

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A rapidly spreading disease of horses and mules prevailed in the San Joaquin Valley of California from July to November, 1930 (fig. 1*A*), and reappeared in several widely separated parts of the state in July, 1931 (fig. 1*B*). The malady is apparently identical with the horse disease which at different times during the past sixty years has caused heavy losses in various parts of the United States, particularly in the west central states, and has been called "Kansas-Nebraska horse plague," and also, incorrectly, "cerebrospinal meningitis," "nonpurulent encephalitis," "forage poisoning" and "botulism."[4]

Studies by Meyer, Haring, and Howitt[5] at the University of California have shown that the present epizootic in California horses is caused by a filter-passing virus which produces an inflammation in the brain (encephalitis) and also in the spinal cord (myelitis). Accordingly, the suitable medical name for the disease should be encephalomyelitis.[6]

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[4] Botulism is a poisoning caused by eating spoiled material in which toxins have been formed by the growth of various types of *Clostridum botulinus*. The symptoms in horses somewhat resemble encephalomyelitis but otherwise the diseases are not related.

[5] Meyer, K. F., C. M. Haring, and B. Howitt. Newer knowledge of the neurotropic virus infections of the horse. Jour. Amer. Vet. Med. Assoc. In press.

[6] In Germany a similar disease has been known for many years, and is called "Borna disease" after a town in Saxony. This disease of horses in Germany is also caused by a filterable virus which produces an inflammation in the central nervous system, but which is probably not identical with the American virus.

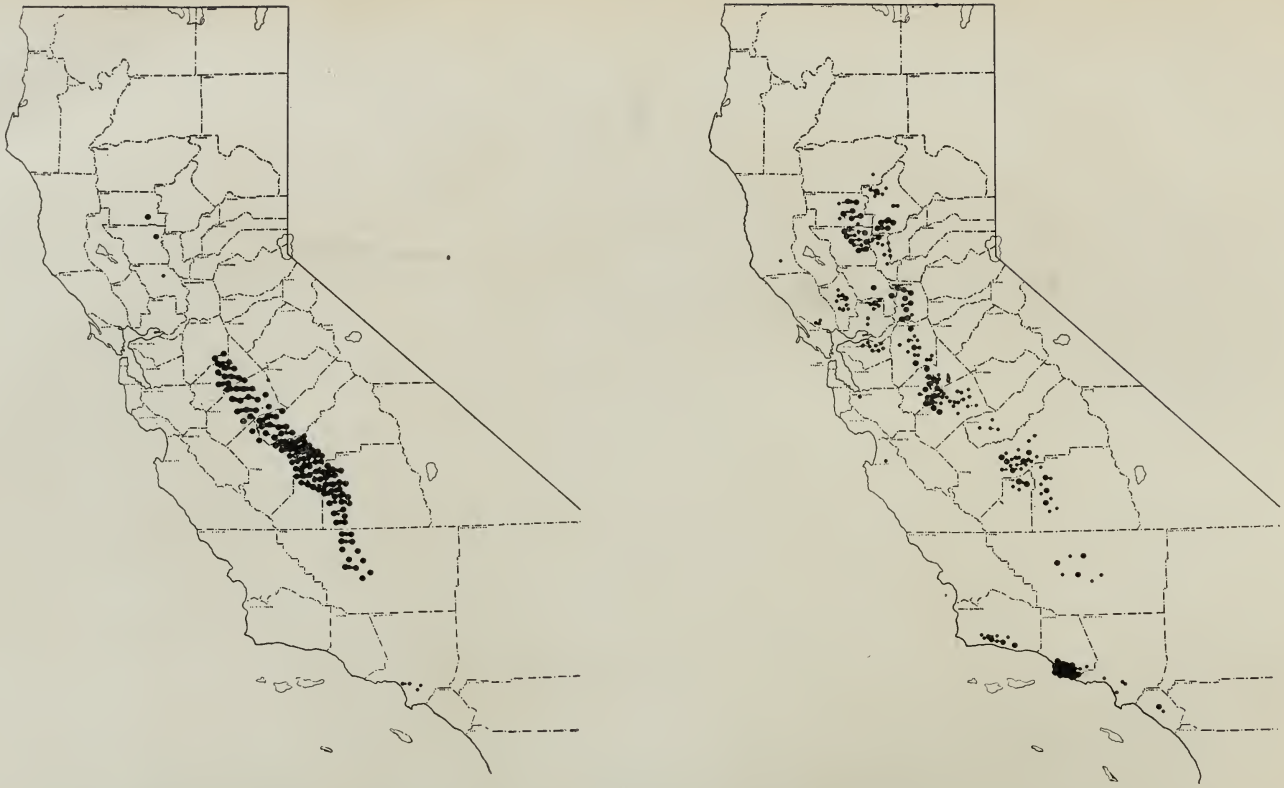

Fig. 1

A, Occurrence of encephalomyelitis in horses and mules, July 1 to December 15, 1930. Each large dot represents about 50 cases, and each small dot, 1 case. The disease appeared in epizootic form in July in Madera County, spread rapidly throughout the San Joaquin Valley, reached its height in September and disappeared in December.

B, Occurrence of encephalomyelitis in horses and mules, June 15 to July 20, 1931. Each large dot represents 10 cases and each small dot, 1 case. From December, 1930, to June, 1931, an occasional sporadic case was reported. With the onset of hot weather in June, 1931, the disease reappeared in epizootic form.

The following statements regarding epizootic encephalomyelitis in horses and mules represent the present concensus of opinion of California veterinarians who have had experience with the disease. These

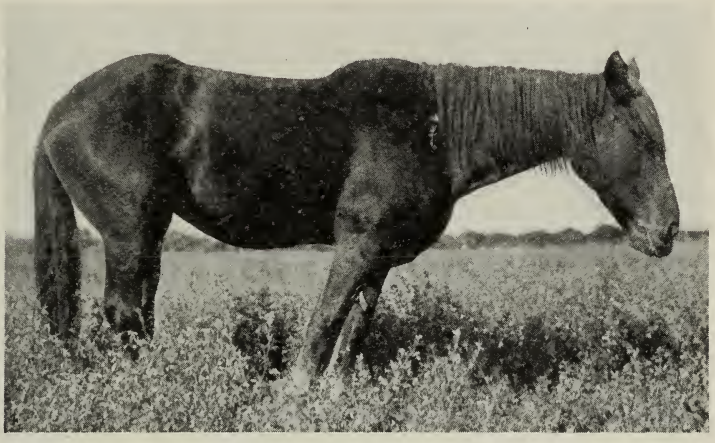

Fig. 2.—Sleepy type.

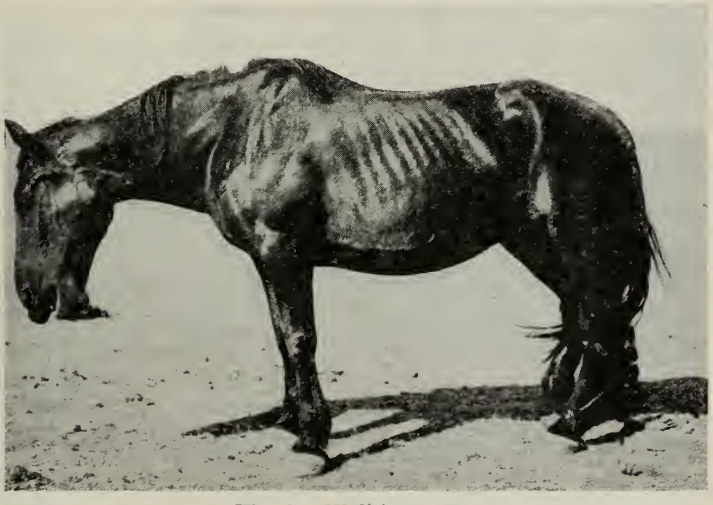

Fig. 3.—Walking type.

recommendations have been prepared for emergency publication to furnish immediately-needed information to horse owners. It is anticipated that in a few months more information will be available.

CHARACTERISTICS OF THE DISEASE

Animals Affected.—Horses and mules are the only animals that have been observed to contract the disease under farm conditions.[7] Age and sex do not seem to be limiting factors. Stallions, as well as geldings and mares, and suckling colts, as well as aged horses, are susceptible. No cases have been reported in this state in animals other than those kept on farms. The disease thus far has been confined to those sections where the land is more or less cultivated, and to date no losses have been reported to the writers in range animals outside of irrigated or farming districts or in horses kept in city stables, such as riding academies, except in certain cases recently brought in from the country.

Symptoms.—In severe cases the animals fall down and are unable to get up or roll over. They lie on their sides, convulsively paw the air and ground and bang their heads against the ground, causing severe bruising especially over the eye. In advanced stages the horses are relatively quiet.

Inability to swallow, spasms of the muscles of the face, neck (fig. 9), and limbs severe grinding of the teeth, a bubbling noise in the throat and very foul-smelling breath are characteristic of advanced, acute cases. Such animals if unable to rise are hopeless and should be destroyed for humane reasons.

In milder cases the animals stagger, sway from front to rear while standing, tend to lean against supporting objects, and frequently grind their teeth or yawn (fig. 8). Two quite different types are common: the *sleepy type,* which drowses until disturbed, when it frequently becomes convulsive; and the *walking type,* which continues to pace round and round (figs. 2 and 3). If in a field, such cases usually follow close to the fence and only change direction when they come in contact with an obstacle or a turn in the fence. When undisturbed, some stand with the head against a wall or fence (figs. 4 and 5).

Recognition of the first symptoms is of importance because the chances of recovery are greater in animals that are carefully treated and nursed from the very beginning. Unwillingness to be led, lack

[7] Experiments at the University of California have shown that the infective virus which is present in the central nervous system of the sick horses can produce the disease in horses, monkeys, rabbits, guinea pigs, rats, and mice when it is injected directly into the brain, and in some instances when dropped into the nostrils or injected subcutaneously.

of spirit, slightly wobbly gait, failure to come when called, or, in unbroken colts, failure to run when approached, are indications. In some animals the first symptoms are a peculiar tightness of the lips; in other cases, the lips are abnormally loose, or twisted to one side

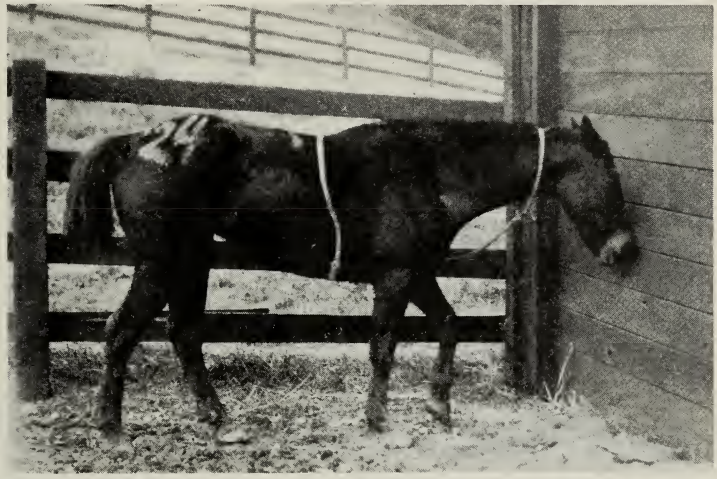

Fig. 4.—Stance when undisturbed, case B–24.

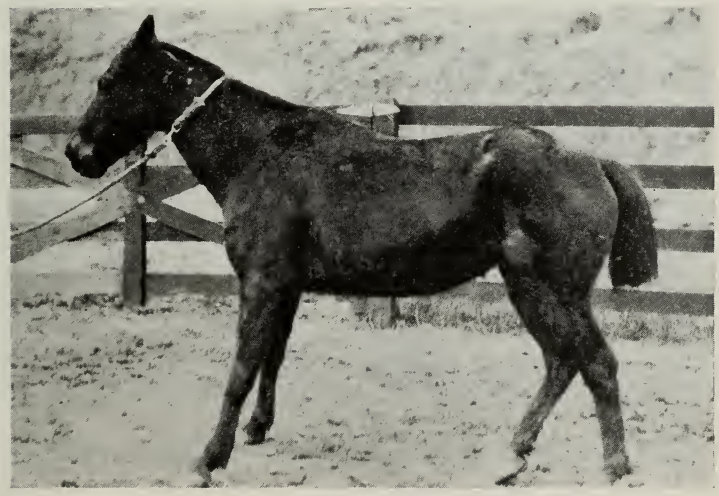

Fig. 5.—Stance when disturbed, case B-24.

(figs. 6 and 7). In advanced stages of the disease, the temperature is usually normal unless complications, such as pneumonia, have set in, but in the early stages the temperature may range from 99° Fahrenheit (normal) to 107° F, according to the individual case.

The Spread of the Disease.—The disease spread rapidly during the months of July and August, 1930, when it invaded all of the horse-raising areas in the San Joaquin Valley. During the following three months, the spread to new areas ceased, but heavy losses continued in the sections already affected. With the advent of cool weather in

A *B*

Fig. 6.—*A*, Tightening of the lips and dilation of the nostrils often continues through the course of the disease, as in this case.
B, Looseness of the lips may be one of the first symptoms, as in this case.

A *B*

Fig. 7.—*A*, Spasm of the facial muscles may cause wrinkling of the muzzle, as in this case.
B, Muzzle twisted toward the right, caused by left facial paralysis.

October and November, the disease disappeared. During the following winter and spring, only occasional cases were reported, but with the onset of very hot weather, late in June, 1931, the disease reappeared in the San Joaquin Valley, and heavy losses have also been reported from the Sacramento Valley and in Ventura County.

Little knowledge is available to indicate how the disease is introduced into a community, how it spreads from farm to farm or from

animal to animal on the same farm. The rôle that flies and other biting insects may or may not have in transmitting the disease is unknown. It is the general belief that the infection is carried by food or water which has at some time been contaminated by infected animals.

Morbidity.—About one horse in ten in the San Joaquin Valley showed symptoms in 1930. Approximately 6,000 head developed the

Fig. 8.—Yawning is a frequent symptom.

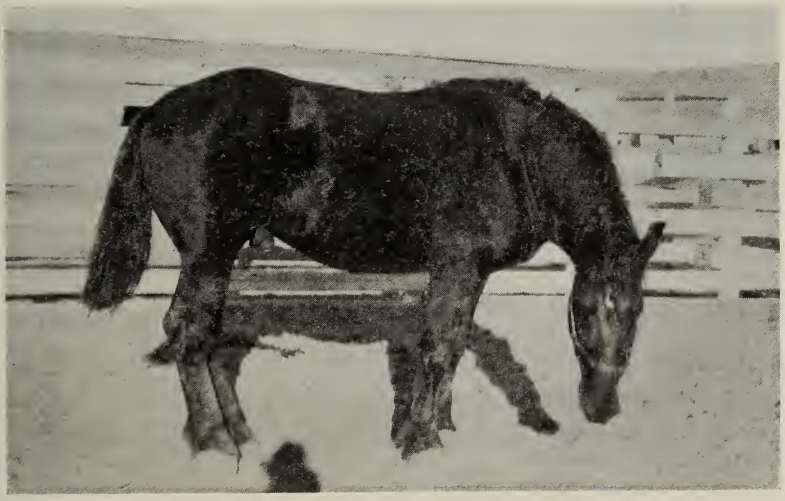

Fig. 9.—Spasm of the neck muscles twists the head to one side in this stallion.

disease, and about 3,000 of these cases terminated fatally. On one ranch with 687 horses and mules, 67 contracted encephalomyelitis and 32 died. On certain farms higher proportions than this have occurred, but it is relatively rare for more than one of a team to show symptoms. This peculiarity can be explained by the hypothesis that many horses contract the disease in such a mild form that it is not recognized.

RECOMMENDATIONS TO ALL HORSE OWNERS IN INFECTED AREAS

The most hopeful preventive measures consist in the complete isolation of all horses so far as is practicable. It behooves one to take into consideration every possible means by which the disease may be carried from an infected farm to premises where no cases have existed; therefore:

Prevent the association of horses from infected areas with those from noninfected areas.

Do not use water from troughs, irrigating ditches, buckets, etc., which have been used by horses on or from infected premises.

Keep horses away from streams, canals, ditches, and pools. Provide an abundant supply of fresh well water.

Suspend breeding operations where horses must be moved from farm to farm. There is a possibility of carrying the disease by moving animals or materials from one farm to another. Judging by what occurs in similar but better-known diseases, one is justified in suspecting that apparently normal horses which have been exposed may be carriers of the virus.

Protect the animals as much as practicable from flies and other biting insects. In the case of certain very valuable animals, it may be worth while, during very hot weather, to confine them in darkened stalls during the day time and use fly sprays liberally. The fact that few cases have been reported in riding academy horses, polo ponies, or city dray horses would justify the precaution of temporarily bringing into barns the very valuable animals now at pasture.

A veterinarian in one of the worst-infected sections of California writes that all cases of encephalomyelitis in his practice had been fed on the ground. He advised feeding from a rack of some kind and killing rats, mice, and ground squirrels. He suggested that efforts be made to stop the transportation of manure from infected districts to localities where the disease has not as yet been diagnosed.

RECOMMENDATIONS TO OWNERS OF SICK HORSES

Obtain the services of a veterinarian as soon as possible. Persons not accustomed to seeing and working with this malady might mistake it in the early stages for azoturia, colic, poisoning, heat stroke, or "staggers" from various other causes.

Keep the sick animals quiet and in the shade. It is imperative that the animals be kept as quiet as possible. Regardless of how slight the manifestation of the disease may be, do not work or exercise an affected animal, as any unnecessary muscular exertion will aggravate the condition. Should the horse become affected at a great distance from the barn, it should not be forced to make the trip back—an

Fig. 10.—A good type of supporting frame with a strong rear crossbar and a feed box high enough to keep the head level with the body.

improvised shade should be erected. Sunlight seems to be of no value in hastening recovery. Horses and mules allowed to remain in the direct sunlight during hot weather will only succumb more rapidly.

Protection from Injury.—Care should be exercised to prevent a sick animal from injuring itself. This may be accomplished by placing the horse or mule between two timbers held fast by four posts with wooden braces across each end (see fig. 10). Cross timbers, front and rear, are necessary because the animal rests by sitting back or leaning forward. Sacks or padding tied to the timbers will prevent undue injury to the body. A box should be placed at one end to hold a water bucket, and a rack should be provided for hay. Chances for recovery are better if the animal can be kept standing. This may be accomplished by the use of canvas or wide belting passed under the abdomen and chest and attached to the side bars.

Support by an abdominal sling, as shown in figure 11, may be preferable in very severe cases. This should be used in conjunction with the side and cross bars, and not as shown in figure 12, so that

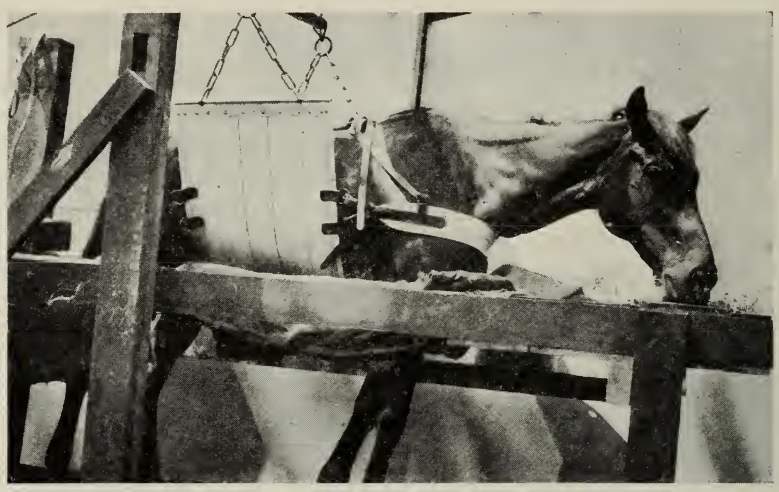

Fig. 11.—The combined use of a sling and supporting frame is desirable in severe cases.

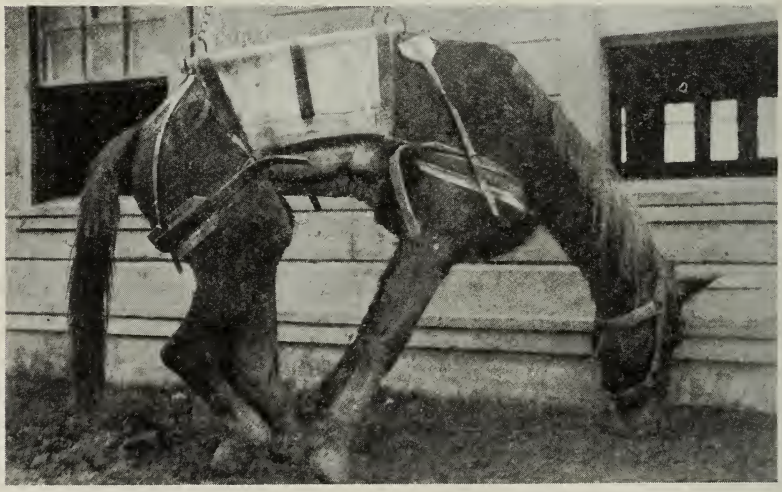

Fig. 12.—The use of a sling without any supporting frame is valueless in severe cases such as this.

during periods of collapse support will be furnished for the head and rump.

Some veterinarians prefer to omit the supporting devices and place the animal in a large box stall. It should be very well bedded with

straw, however, and if the animal gets down an effort should be made to keep it in the breast position shown in figure 14. Bales of hay and sacks stuffed with straw are useful in doing this. If left to lie flat on

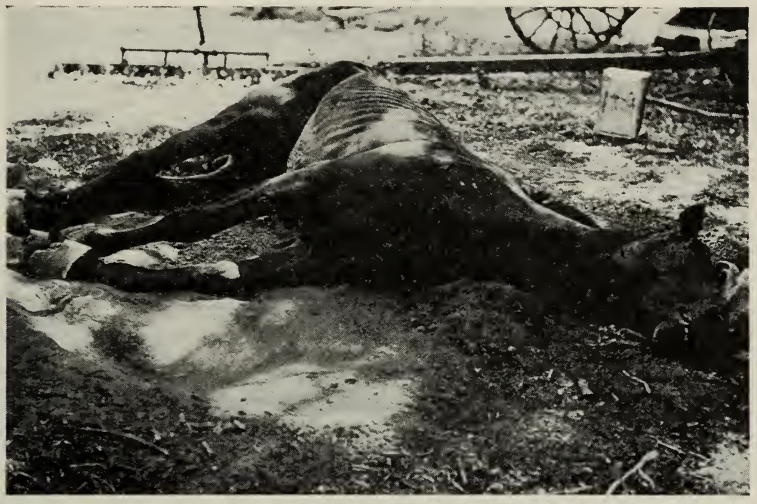

Fig. 13.—Animal lying flat on its side without any protection from the ground. Do not permit this when possible to get it to stand or assume a breast position.

Fig. 14.—Assisting an animal to assume a breast position.

its side, the body and head soon become seriously bruised from contact with the ground (fig. 13). Two or three times a day the animal should be assisted to its feet. A veterinarian who treated about 75

cases during July, 1931, writes: "The horses that were able to get up on their feet occasionally during the first four days of the sickness all got well."

Animals that are unable to rise should be turned over at four or five-hour intervals to avoid congestion of the blood in the lower part of the body. This will also tend to prevent "bedsores," pneumonia, and other complications which quickly develop if a horse lies for a long time on one side.

Feed.—Small amounts of wholesome food, such as freshly-cut alfalfa or cured alfalfa, or, if neither is available, good grain hay, will materially help in sustaining the strength of the affected horse. In mild cases, the appetite usually remains normal and many horses badly affected will consume some food if it is placed before them. They often nibble hay from the rack or ground as the disease progresses. Feeding will take place only when the sick animal can secure food with little or no effort. Some of the animals refuse food for a few days, but, as recovery sets in, the appetite returns to normal and should be satisfied with the best quality of feed obtainable.

Water.—Thirst is one of the most common symptoms, and it is generally believed by veterinarians that the animals should be permitted to drink as often and as much as they wish.

Studies at the University of California have shown that, in advanced cases, there is a marked dehydration of the blood and tissues. This indicates that *sick horses should be induced to drink as frequently as practicable.* Those that are able to swallow usually drink eagerly and should have constant access to a good, clean water supply. They should not be made to drink from containers on the ground as they will have difficulty in keeping their balance while lowering the head. In some cases, there is a semiparalysis of the lips, tongue, and pharyngeal muscles. Such animals will often dip the muzzle in water but apparently make no attempt to drink. If water is slowly injected into the mouth (fig. 15), they generally swallow willingly. Time and patience will be necessary in cases that have difficulty in drinking. Care should be taken not to raise the mouth and nose too high nor to attempt to force water or other liquids down the throat.

Avoid drenching. Attempts by forced drenching to administer oils, salts, and other drugs to animals affected with encephalomyelitis are very apt to result disastrously. The horse may be in a state of stupor or collapse, or it may be excited. Either of these conditions is associated with difficulty in swallowing. Elevating the head, as is usually done in drenching, may cause the fluid to pass down the trachea or

windpipe into the lungs, which, in turn, in these cases almost invariably produces a mechanical pneumonia.

The safest way to introduce liquids into the stomach of a horse or mule is by the use of a stomach tube. On account of the difficulty of passing the tube through the mouth of these animals, it is usually passed via a nostril. This operation should be done by a veterinarian. In certain cases the use of the stomach tube has been found to be injurious because its passage has induced pneumonia from inhalation into the lungs of putrid saliva collected in the throat. Rectal injec-

Fig. 15.—Assisting a thirsty animal to drink. A short piece of metal pipe is inserted a few inches into the mouth. To prevent choking do not insert the pipe too far nor raise the head too high.

tions may be helpful but should be given only on a veterinarian's advice.

Do not experiment with drugs not prescribed or recommended by a veterinarian. The chances of recovery will probably be lessened by such dosing. Even if the drugs should be harmless, the unnecessary disturbance and irritation in giving them to the animal may reduce the chance of recovery. The sick animal should be kept as quiet and undisturbed as possible.

Each case requires special, individual treatment. No specific treatment generally applicable to all cases has yet been found. The most successful veterinarians depend on conservative efforts to alleviate the symptoms. University veterinarians, in cooperation with various

veterinary practitioners, have tried a number of chemicals and serums, but as yet nothing has been found of special value in neutralizing or reducing the effects of the virus which is the primary cause of the disease.

Experiments with the virus under controlled conditions are being actively carried on at the University of California. Any results of practical value will be immediately made public.

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